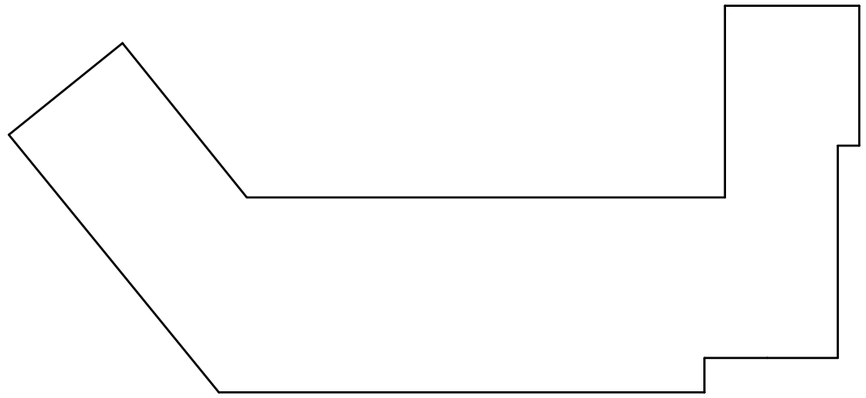

LINNAKAUPUNKI SCHOOL

A Masters Thesis in Architecture
Department of Architecture
Aalto University
Autumn 2018

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ABSTRACT

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As suggested by the City of Turku, I did my thesis on school architecture, with the end result being architectural plans for a new school in the neighbourhood of Linnakaupunki, Turku.

The project required studying and analysing the history, current situation and future of the neigbourhood and it's surroundings. I also researched both international and finnish school architecture in general, with a focus on finnish school architecture history. Furthermore, I defined parameters for choosing suitable reference projects from current architecture. I studied and analysed the projects based on their room programmes, spatial planning and aesthetic aspects.

Based on information acquired from both the City of Turku and my own research, I defined the room programme for the project. One of the goals for planning the school was that it should be planned in phases, enabling it to grow as the neighbourhood was being built.

The next part of the project was to test different ideas and concepts to find out what works both on the site and with the different building phases. With the information gained from the concept testing, I chose a design that I developed further.

The objectives were to have a building that was suitable in the neighbourhood, which was to be built quite densely and with defined city blocks, while at the same time leaving as much of the site as possible for the schoolyard. With the site connecting to a major city park on one side, it was natural to place the yard in direct contact with the park. Bringing the mass of the building right up to the street, the functions of the school are being displayed as a part of the cityscape, livening up the neighbourhood and encouraging multi-purpose and night time use of the spaces. Placing the parking and maintenance entrances in the north of the site, at the back of the building cleans up the street facade for pedestrians.

The spaces of the school are arranged around an atrium-like main hall, from most public (ground floor) to most private (third floor). Especially the spaces on the ground floor are designed to be easily accessible in the nighttime and n weekends, to get the most effective use out of the building. The spaces are arranged into home units, where each class have their base for subjects like finnish and maths, and other teaching spaces that are more specialised toward certain subjects. Wood is used as the main building material as it is a renewable resource.

Keywords: school architecture, primary school, elementary school, education architecture, Turku, Linnakaupunki

ABSTRAKT

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Diplomarbetet behandlar skolarkitektur, och arbetets målsättning är att föreslå planer till en ny skola i den nya stadsdelen Linnakaupunki i Åbo. Förslaget framförs i form av arkitektritningar för skolan. Arbetet gjordes på ett förslag av Åbo stad, men har utformats självständigt.

I projektet studeras och analyseras stadsdelen Linnakaupunkis historia, nuläge och framtida utveckling. Arbetet utforskar även både internationell och inhemsk skolarkitektur, med fokus på den finska skolarkitekturens utveckling. Internationell skolarkitektur analyseras i form av referensprojekt som utvalts genom prioritering av relevans. Referensprojekten analyseras genom att undersöka rumsprogram, spatial planering och estetiska aspekter.

På basis av information från både Åbo stad och slutledningar av egen efterforskning, utformas ett rumsprogram för Linnakaupunki skola. En av huvudmålsättningarna är att skolan byggs i faser, vilket möjliggör att den kan växa i takt med att stadsdelen utvecklas.

I projektets nästa del undersöks och jämförs ideer och koncept med syftet att komma fram till vad som fungerar bäst, både i förhållande till tomten och till byggfaserna. Utgående från slutledningarna väljs ett koncept för vidare utveckling.

Målsättningarna var att skapa en byggnad som passar in i stadsdelen, vilken i framtiden karaktäriseras av rätt så urbana och vinkelräta stadskvarter. Samtidigt prioriteras skolgårdens storlek och anknytning till Venice park, ett större grönområde som gränsar till projektets tomt. Genom att placera byggnadens massa intill områdets huvudgata, framhävs skolans aktiviteter som en del av stadsbilden, vilket gör gatan mer livlig och uppmuntrar till användning av byggnaden även kvällstid och under veckosluten. Genom att placera parkering och lastningsingången norr om byggnaden frigörs gatufasaden till fotgängare och cyklister.

Skolans utrymmen finns placerade runt en atriumlik huvudhall med de mest offentliga utrymmen på bottenvåningen och de mer privata på andra och tredje våningen. Många av utrymmena är avsedda även för kvälls- och veckoslutsbruk, vilket effektiverar byggnadens användning. Undervisningsutrymmena är grupperade i sk hemenheter, där varje grupp har sin basundervisning, medan ämnen som kräver mer specialiserad utrustning är i gemensam användning. Trä anvands som huvudsakligt byggmaterial pga att det är en förnybar resurs.

Nyckelord: skolarkitektur, grundskola, skola, utbildning, Åbo, Linnakaupunki

CONTENTS

0.1 | Introduction

After moving to Turku in 2015, the town had really grown on me and it seemed like an obvious choice to search for a thesis subject that was somehow related to the city. When interviewing some people in the city planning office, a few possibilities came up, both related to education.

A new neighbourhood was being planned and built in Skanssi, and in the near future, the need for a new school would surely arise. The neighbourhood was being planned on the outskirts on Turku, next to the Skanssi shopping center, on ground that had previously been (and presently still largely is) fields and forest. The other option was Linnakaupunki, an ambitious project that entailed a major refurbishment of the area north of Turku harbour and Turku castle.

The area is today mostly occupied by smaller industrial and storage buildings, with very little housing, but because of its proximity to the city center, the neighbourhood has great potential for development. The zoning plan from 2010 states that the area is currently divided, incoherent, and not being used to its full potential. The vision is to create a new urban neighbourhood that unifies the area and provides housing, offices and business space for inhabitants. By the year 2030, the number of people living in Linnakaupunki will increase from around 1000 to 20 000 or more.

With this increase in population, the area will inevitably need a new school building, if not several. While talking to the city planning office, the idea of a flexible, expanding school was suggested. A school that would start smaller when the neighbourhood was still being built, and that would gradually expand and develop to meet the needs of the new population.

As I found both the area of Linnakaupunki and this notion of an expanding school building extremely interesting, the choice of thesis subject was made.

1 | ANALYSIS OF THE SUBJECT

1.1 | A brief history of Finnish school architecture

1.2 | Current trends and tendances in school architecture

1.3 | Selection ans analysis of the reference projects

1.4 | The future of schools and education

1.5 | Thoughts and conclusions

▼ Valter Jung, Emil Fabritius: Oikokatu Primary School, Helsinki 1905
◀ Väinö Vähäkallio: Kallio Coeducational School, Helsinki 1929
▲ Gunnar Taucher: Aleksis Kivi School, Helsinki 1934
Photo credit: Museum of Finnish Architecture

1.1 | A brief history of Finnish school architecture

Before the 19th century, schools in Finland were most often not housed in buildings designed specifically for the purpose of education. Around the middle of the 19th century, schools started to be designed either by architects (urban areas) or built according to standard type drawings (rural areas). Before the 1900s, the architect responsible for designing schools was typically a civil servant, but after the turn of the century, architecture competitions started to become the norm. Competitions, either open or invited, remain the standard approach when constructing a school today.

In the countryside, the school building was usually a one story wood structure, while the urban equivalent was made of stone or brick and usually consisted of several floors. The disciplinary ideas about education and upbringing were reflected in the strict architecture of the schools.

Almost from the beginning, the school buildings have had an important role in the community, providing spaces for example for scouting, art and youth clubs in addition to traditional education purposes.

During the national romantic period, architects criticized the idea of using standard type drawings when building schools, declaring that each school should be designed individually.

The schools built during this era clearly display the architectural ideals of the time with their assymmetry and ornamental detailing. The floor plans were also becoming more irregular and unrestricted in their typology.

The national romantic or jugend period quickly gave way to the more symmetric nordic classicism. This style can be observed in the proposals of the numerous school architecture competitions that were arranged during this time. In the 1920's, soon after Finland declared independence, primary education was made compulsory for children aged 7-13, which increased the need for constructing new schools throughout the country. Around this time, some schools also started to provide hot lunches and basic health care for the pupils, so these spaces were added to room programmes.

The construction of schools slowed down again during the depression in the early 1930's, but the development of the public schools continued. As functionalism became the main architectural ideal, the room programme started to be divided into different annexes, usually the gymnasium spaces, the assembly hall and the classrooms were separated into different units. In line with the ideals of the time, the spaces were to receive plenty of daylight and fresh air. [1]

[1]Museum of Finnish Architecture: mfa.fi/koulurakentaminen

▲ Aarno Ruusuvuori: Roihuvuori primary school, Helsinki 1967
▶ Kaija & Heikki Siren: Helsingin Suomalainen Yhteiskoulu, Helsinki 1972
▼ Jorma Järvi: Pakila primary school, Helsinki 1954
Photo credit: Museum of Finnish Architecture & Heikki Havas/SRM

After recuperating from the war during the 1940's, the 1950's started a new chapter in Finnish school architecture. As the baby boomers reached school age, the need to construct more schools arose once again. The school buildings of this era had wider hallways, more and larger openings both towards the outdoors and to adjacent interior spaces, all to improve the lighting.

With the number of schools increasing, school architecture also started to develop into different typologies, one being the central vestibule concept, where all functions are arranged around a large open space, while another one, the home unit concept, divided the school spaces into separate, individually functioning home units. Scaling the building to suit children meant that the number of floors was reduced to two or three at most.

Low-rise school architecture continued to be popular into the 1960's, as most were flat roofed two story structures. Horizontal lines were accentuated by the use of strip windows. Interior spaces were often designed to be easily rearranged or expanded, for example through modularity.

In the 1970's, the development of the individual pupil was set as the main goal, which led to changes in the teaching practice. In addition to traditional classroom instruction, integrated classes, group work and individual work were becoming more prevalent, creating a need to adapt the spaces appropriately.

During this period, the selection of elective subjects grew, which dramatically altered the standard school room programme. A lot of renovations were carried out on older schools that no longer had the facilities to accomodate the needs of a modern education. Instead of having a main home classroom where almost all of the teaching takes place, spaces were becoming more specialized for certain subjects.

The codes and regulations for school architecture were very strict at the time, dictating for example window size and replacement as well as the proportions and materials of the facades. This led to a faceless, institutional appearance that has later been critisized.

The objective of efficient use of the building led to the further development of a multipurpose functionality, which remains one of the main goals for school architecture today.[1]

[1]Museum of Finnish Architecture: mfa.fi/koulurakentaminen

1.2 | Current trends and tendances in school architecture

When studying contemporary literature and articles about school architecture, there are certain words that are used frequently, such as “multipurpose” or “flexibility”. These same terms have been used to describe school architecture at least since the 1960’s, if not earlier. The exact meaning has changed over the years, but these have been the general goals when building schools for a long time. The reason for this could be that these are universally positive-sounding objectives (who would advocate for a single-purpose, inflexible school?) that can easily be added on to any room programme or description. The key lies in how these objectives are implemented in practice.

When talking about flexible spaces today, we try to make spaces that meet the needs of different types of learners, as not everyone learns best in the traditional classroom setting. It’s up to the building to offer a varied range of places where the student or the teacher can then choose the one that best fits their learning or teaching requirements at that particular moment. [1]

Associated with the terms multipurpose and flexibility is also often the use of the school building after school hours or on weekends by opening up the sports facilities, woodwork spaces, music classes or home economics for the community. Certain facilities, like a library or a health center, can be open to the public during school operating hours as well. This type of flexibility will obviously save resources and get the most use out of the spaces, but there is also the added benefit of socially connecting the school to the community.[2]

There is a general inclination in todays society to centralize and consolidate as much as possible, and as research has shown that bigger units actually achieve better results, the trend of larger schools seems to be here to stay. This in turn brings about its own challenges when it comes to the architecture of the megaschools; how to design the building to fit the scale of a child?[1] One answer among others is to divide the room programme into smaller units, for example according to the childrens age, simultaneously dividing the schoolyard into smaller, more protected nooks. This results in the currently trendy “star” or “glove”-concept.[2]

As our society becomes more and more sedentary, another aspect to consider is how the school environment could be planned in order to encourage movement as much as possible. A strong connection between the interior and the exterior is of essence when it comes to inspiring the children to move and play outdoors.[1]

[1]YLE article: “Millainen on parempi oppimisympäristö?” Minna Joenniemi 22.5.2015
[2]Arkkitehtilehti 2/2017

16 Collège Lucie Aubrac, photo by Julien Lanoo

1.3 | Selection and analysis of the reference projects

Being able to choose the most relevant reference projects to analyse from a wide selection of work required a fixed set of critera which each project would have to fulfill.

Date | As I wanted the reference project to mirror current trends in educational architecture, I chose to only include projects that were finished after 01.01.2012

Size | To be able to make a relevant analysis, the reference projects would have to be at least roughly the same size as Linnakaupunki school, that is to say between 8000 and 15 000 m^2. In addition to the building area, the number of pupils should also be comparable, between 600 and 1000 children.

No unfinished projects were selected, as it would be inconsistent to compare finished projects to works in progress. Furthermore, I tried to keep the projects as different as possible within the criteria, selecting work from varying countries and environments, with different concepts and esthetics.

The analysis was carried out by examining the architecture of each school, underlining the most distinctive characteristics of each project. Important aspects include the placement of the building on the site, the spatial implementation of the room programme, the flexibility and innovation within the teaching spaces and the general atmosphere and esthetics of both exterior and interior spaces.

Plan typologies

I-type
- a straight volume with a central corridor

X-type
- a central hall with three or more radial wings

L-type
- building units are situated orthogonally to each other

E-type
- a comb-shaped volume

O-type
- a central hall around which all spaces are situated

In practice, these typologies rarely exist in their theoretically pure form, as they are more often combined into hybrid type buildings that consist of two or more typologies. Simplifying the building typologies is helpful when analysing the use and juxtaposition of space in the reference projects.

Photos: Andreas Meichsner & Tuomas Uusheimo

Main floor plan, not to scale

Saunalahti School, Espoo
Verstas Architects

Grades: preschool and grades 1-9
Dimensioned for 750 children
Total building area: 10 500 m²
Area per child: 14 m² / child
Year of completion: 2012

- Main hall / lobby / atrium / cafeteria
- Classroom spaces
- Art / music / woodwork / home economics
- Kitchen / maintenance
- Administration
- Sports facilities
- Library / youth facilities / community spaces

The building is situated between the street and the yard, sheltering the schoolyards and distinctly creating an "inward" and "outward" facade. Combining the topography of the site itself with the spatial planning, the architects have succeeded in dividing the somewhat intimidating room programme into smaller groups of spaces, that operate at least partly as independent units. As the school ranges from preschool to grade 9, this has also allowed the different classes to have their own distinct home areas, the spaces being modified to more precisely meet the social and pedagogical needs of each age group.

An important aspect in the planning of the school was also to open up a lot of the spaces for community use. The sports facilities on the basement floor are accessible directly from outside and designed to operate independently. Other examples of expanded use are the mini library and auditorium next to the main street entrance. The workshop spaces on the main floor, including woodwork, home economics and art are all situated facing the street but are not independently accessible.

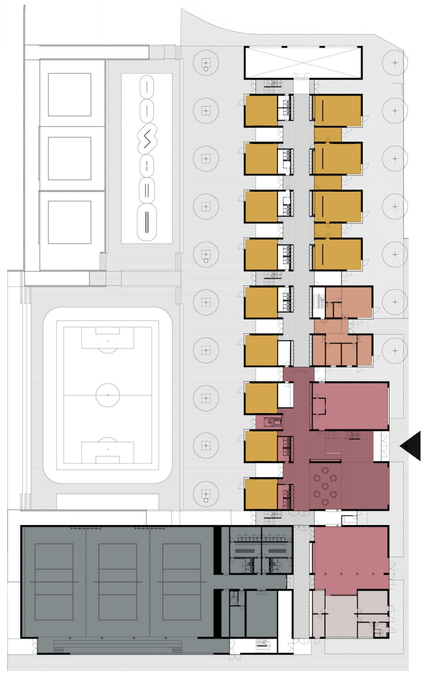
A common feature in recent school architecture is also found in Saunalahti - the cafeteria spaces double as audience seating during events and festivities, the stage opening toward the high cafeteria hall.

Because most of the extensive room programme is concentrated on the main floor (the basement and second floors being a lot smaller) the school risks becoming quite a corridor heavy building. Although this is somewhat unavoidable, the architects have succeeded in keeping the corridor length to a minimum and trying to incorporate daylight wherever possible. There are also seven different staircases shortening the distance between spaces inside the building. The staircases have been colour coded In order to make orientation inside the building easier. As an interesting side note, the service entrance has not, as is perhaps the most common practise, been hidden away at the back of the building, but brought right to the main facade.

The main teaching spaces, here marked in yellow, are quite traditional, strongly reminiscent of the conventional classroom, but flexibility might come from other aspects like furnishings, equipment etc.

Overall, the layout of the building is quite logical and easy to understand even for children. There is the workshop area towards the street, the classroom spaces towards the yard and the sports facilities towards the parking lot. All these spaces are situated around the main hall, the cafeteria and the lobby spaces. The building is compact and concise, not wasting any square meters.

Photos: Nelson Garrido



Main floor plan, not to scale

Baltar School, Baltar, Portugal
CNLL

Grades: Primary and middle school
Dimensioned for 720 children
Total building area: 10 261 m²
Area per child: 14 m² / child
Year of completion: 2012

- Main hall / lobby / atrium / cafeteria
- Classroom spaces
- Art / music / woodwork / home economics
- Kitchen / maintenance
- Administration
- Sports facilities
- Library / youth facilities / community spaces

At first sight, the Baltar school makes a strict impression with its raw concrete exterior, seeming almost stoic in its appearance. But the architecture is also contemporary, simple and almost playfully industrial.

The replicating facade is reflected in the interior spaces, or perhaps it's the other way around - the classroom spaces can be perceived as repetitively monotone, which, in a way, lends to their flexibility. What can be done in one space, can be done in them all, as no hierarchy of spaces exists. But does the monotony flow over to the teaching or does it act as a sort of equalizing tabula rasa for the educators and pupils?

A quick analysis of the teaching spaces reveals that very few larger spaces are available, most classrooms accomodating only around 25 students at a time. The only exeptions are the auditorium close to the main entrance, the cafeteria, and the library on the second floor.

Each classroom is connected to either the inner courtyard or the street by its own entrance, and the spaces above the entrance on the second floor are used as smaller teaching spaces, suitable for meetings or group work. In a warmer climate, this could be a very useful way of moving the teaching outside for a more relaxed work session.

For a school with such a vast room programme, and with a pupil count of around 720, certain spaces seem to be slightly underdimensioned, specifically the spaces for the teachers and the administrative staff.

The quality of the sports facilities, with a separate entrance and lots of space for spectators, was highly prioritized, these spaces making up over a third of the schools total floor area.

Orientation in the school has been made extremely easy, as all spaces are grouped around a central corridor, resembling a town high street. Furthemore, the second floor is an almost exact copy of the ground floor. A potentially dreary space, the main corridor is made wide enough not to be oppressing, and the regular openings between clasrooms provide sufficient daylight.

In conclusion, the Baltar school is a rationalists dream, as it has succeeded in producing an efficient and neat building that still doesn't feel like it's crammed or like it lacks beauty or inspiration.

Photos: Julien Lanoo

Main floor plan, not to scale

Collège Lucie Aubrac, Tourcoing, France
Coldefy & Associates Architects Urban Planners (CAAU)

Grades: Middle school (11-15 years old)
Dimensioned for 680 students
Total building area: 10 382 m^2
Area per child: 15 m^2 / child
Year of completion: 2013

- Main hall / lobby / atrium / cafeteria
- Classroom spaces
- Art / music / woodwork / home economics
- Kitchen / maintenance
- Administration
- Sports facilities
- Library / youth facilities / community spaces

Housed in the same buidling complex as the school is a sports complex and other communal spaces that are open to the public. The different spaces each have their own entrances and can be used independently. The entrances to the sports complex and the community spaces are situated towards an open plaza while the school entrance is towards the street. Parking and maintenance is placed to the north of the building while outdoor sports facilities are found in the east border of the site.

The entry plaza, situated between two major roads, has a serene minimalistic quality that is mirrored in the building mass itself. The facades of the building are of three distinctly different themes, light grey brick and glass are the main materials of the plaza facades of the building, a pixelated pattern curtain wall coats the teaching spaces and the cafeteria, situated like a separate pavilion in the courtyard, has a more artistic appearance with its green roof and aluminium eaves.

It isn't the most conventional placement of a school cafeteria, quite far from the main entrance and only accessible from outdoors, but this layout has many merits. Firstly, the area is the most parklike of the site, with greenscape on two or even three sides of the pavilion. Separating the cafeteria building itself also means separating lunchtime from the rest of the day, making it feel more like a proper break from schoolwork, leaving the children more energized to continue their day afterwards. This also illustrates a more continental approach to lunchtime at school.

Concerning the layout of the rest of the building, the spaces are organized around quite a narrow, compact corridor, making it easy and effective to move within the building, but inevitably creating a somewhat institutional atmosphere. The corridor, which is replicated on upper floors, also stays the same width throughout, and especially the main entrance seems a bit stunted and underwhelming. On the other hand, the courtyard could be intended to take over the role of atrium, a functional concept in a warmer climate.

As a whole, the school building makes quite a rational and functional unit, with a traditional take on learning and teaching spaces. Although the design is contemporary and the structural mass has a dynamic character with much attention to detail, the functional aspect leaves a bit to be desired, especially concerning innovative learning spaces.

Photos: Hufton + Crow

Main floor plan, not to scale

Frederiksbjerg School, Aarhus
Henning Larsen Architects

Grades: daycare and grades 1-9
Dimensioned for 920 students
Total building area: 15 000 m^2
Area per child: 16 m^2 / child
Year of completion: 2016

- Main hall / lobby / atrium / cafeteria
- Classroom spaces
- Art / music / woodwork / home economics
- Kitchen / maintenance
- Administration
- Sports facilities
- Library / youth facilities / community spaces

The main idea when designing the Frederiksbjerg school in Aarhus was to create a building that promotes physical activity, not only while using the sports facilities but throughout the school day. Children are encouraged to move around by making the spaces fun, interesting and full of discoveries. According to the architects, physical activity is inevitable at Frederiksbjerg.

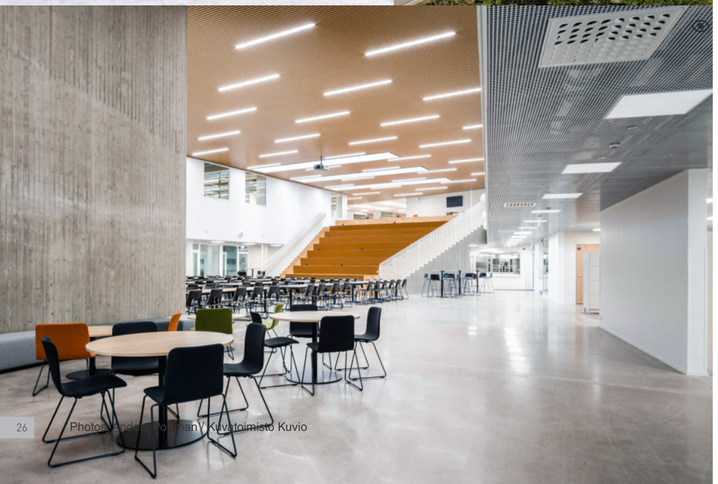
It's widely known that children today often do not get enough exercise, even if they have a physical hobby, as more of the day is spent sitting down than before. But obviously the way to correct this imbalance isn't to tell the children to move more, but to create an environment which encourages physical activity. At Frederiksbjerg, you can choose to climb up to the second floor instead of taking the stairs or to crawl through a tunnel in the wall instead of walking around to get to your classroom.

The classrooms, and other teaching spaces, are usually also not readily furnished with chairs and tables, and the group decides itself how to use it, depending on the learning objective.

Spreading out from the the main entrance, the core area (in red) flows into all the different directions, creating a lot of public spaces to stop, learn and play. The use of this space may seem a bit ineffective, as there is also a lot of "empty" square meters, but the programme being the size it is, the lobbies and hallways have to be scaled to accomodate the movements of over 900 children without feeling to constricted. Overall, moving inside the building has been made quite easy using several main staircases and larger open spaces instead of corridors, but the layout is not the most straightforward, and navigation can possibly be a challenge before you get familiarized with the spaces. But as stated before, it is all designed to be an adventure.

Playfulness is a theme also when it comes to the exterior of the bulding, its' large overhangs being supported by a forest of pillars, and the square windows strewn about the facade in an arbitrary, careless way. A lot of attention has also been put into designing the outdoor spaces, creating different areas and nooks to explore and socialize in.

At first sight, the floor plans of the school may seem slightly chaotic, but this characteristic also helps break the programme down into smaller spaces that feel more intimate, an important step in making the children feel like the school is their own space. The exterior succeeds in simplifying the building mass, anchoring the school firmly into the urban structure of the neighbourhood.



Photos: Veikko Somppi / Syvälahti Kuva-toimisto Kuvio

Main floor plan, not to scale

Syvälahti school, Turku
Verstas Architects

Grades: daycare, preschool and grades 1-9
Dimensioned for nearly 1000 children
Total building area: 11690 m²
Area per child: 11 m² / child
Year of completion: 2018

- Main hall / lobby / atrium / cafeteria
- Classroom spaces
- Art / music / woodwork / home economics
- Kitchen / maintenance
- Administration
- Sports facilities
- Library / youth facilities / community spaces

Freshly opened for the school year 2018-2019, this ambitious project encompasses a massive room programme, but the ratio of square meters per child is by far the lowest among the references projects. This begs the question of whether the number of children is too ambitious or if the square meters used have been reduced too much in an effort to economise the use of space. Or is this project simply the one that has succeeded the best in optimising the floor plans?

Situated on a large sloping site on the outskirts of Turku's urban area, the buidling mass can at first sight seem quite imposing with its strict and slightly somber facade. The main entrance and parking lots are placed towards the road while the schoolyard is located behind the building, on the edge of a large area of untouched vegetation.

The building mass consists of four separate “blocks” that are connected in the middle by the lobby and atrium area, where the main staircase and scene are also situated. The sports facilities and kitchen make up one block, the home economics, music and art spaces are placed on both sides of the main stair, and the library, staff spaces and classroom spaces are found to the left of the main entrance.The main hall feels like a natural gathering area and flows quite easily into the different zones of the building, but it has one major flaw - the lack of daylight. This means that the cafeteria space is almost completely out of reach of daylight and has no windows to the outside, except for the space beside the stage that gets some daylight and views from the main entrance. The closedness is somewhat alleviated by the height of the space, but it still seems like the arrangement was the result of unfortunate necessity rather than optimised planning.

The classroom teaching spaces are flexible and enable a variety of different learning environments, from small groups to larger classes, from quiet, more intimate spaces to public and open areas.

The whole programme is concentrated on two floors, the only spaces situated on the third floor being technical, but the facades make it seem like there is a lot of unused space on the third floor. Perhaps moving a few teaching spaces up to the third floor would have freed up some window walls for the cafeteria?

Despite having some design flaws, Syvälahti school is a result of good and rational planning, and it will be interesting to see how the pupils and personnel settle down and make the building their own.

Conclusion of the analysis

What is clear from analysing the refererence projects is that there is no universal right answer when it comes to school architecture. As a matter of fact, the diversity that is represented in these and other education related projects is quite inspiring.

Having said this, each one of the analysed projects does have its merits as well as its downfalls, both of which can be useful tools to keep in mind while working on education related projects. Some are objective successes and flaws while some are more opinion or value based choices.

For this particular project, there are a few observations that I will keep in mind when continuing the design process. First of all, for a school of this size, the main hall or atrium area needs to be quite spacious, and while all of the reference projects didn't value daylight and outside views from this area, this is something that seems essential to the quality of the space, especially if it's also used as the school cafeteria.

Concerning the home units of each class, the analysis helped clarify how to achieve flexibility within the unit. For the most part, there are two major variables to consider; the size of the group and the level of intimacy or openness of the space. In order to be flexible as a learning environment, the unit should provide spaces of varying sizes and levels of openness. This same principle also applies when planning the rest of the teaching spaces.

1.4 | The future of school architecture

A new curriculum for Finnish schools was put into effect in the fall of 2016, and since its initiation it has been both criticized and praised. The main changes to the previous curriculum were that there would be more collaborations between subjects, concentrating on phenomena rather than strictly adhering to the traditional subject limits, and that the focus of the evaluating system would shift more towards self-evaluation and discussions with the students and away from the strict numbered grades, with only one grade being given for each subject at the end of the school year.[1]

The curriculum has been criticized for putting too much responsibility on the children, asking them to be more diligent, goal oriented and self motivated than can reasonably be required at their age. This in turn puts more pressure on the role of the parents, creating an inequality between families from different backgrounds. There is also reported to be big discrepancies between schools in how the new curriculum is actually implemented. At this stage, it remains to be seen how the changes have actually impacted the learning results in Finnish schools.

The importance of information and communications technology, both as an independent subject and as a tool for learning other subjects, will continue to grow.[2] At the same time, concentration difficulties and shortened attention spans will be a problem that future schools will have to focus on solving. Health, mental wellbeing and development, both mental and physical, are becoming a more and more important goal in addition to the traditional learning objectives.

The objective of future school architecture is of course to observe and facilitate the develompent, while remaining farsighted when it comes to rapid changes.

[1]Opetushallitus
[2]YLE article: "Millainen on parempi oppimisympäristö?" Minna Joenniemi 22.5.2015

1.5 | Thoughts and conclusions

The reponsability or duty of a school is quite a lot more extensive than just teaching the subjects listed and making sure the children learn what's required. One of the most important responsibilities of a school is to prepare the children for the rest of their life, helping them become balanced adults that can function and thrive in our society.

Some children might learn best when working and communicating in a group while others prefer to read and contemplate by themselves. Sometimes the teaching benefits from being done in a closed and focused environment, sometimes in a more open and communicative one.

That being said, for the learners to be able to develop their individual skill sets, it's also important to sometimes leave the familiar comfort zone and work in a way that feels more difficult. School is also about teaching the pupils to communicate, to be flexible, and to handle difficult situations.

2 | ANALYSIS OF THE SITE

2.1 | Introducing the site and area

2.2 | A brief history of the surroundings

2.3 | Current planning situation

2.4 | The immediate site

2.5 | Conclusions of the analysis

2.1 | Introducing the site and area

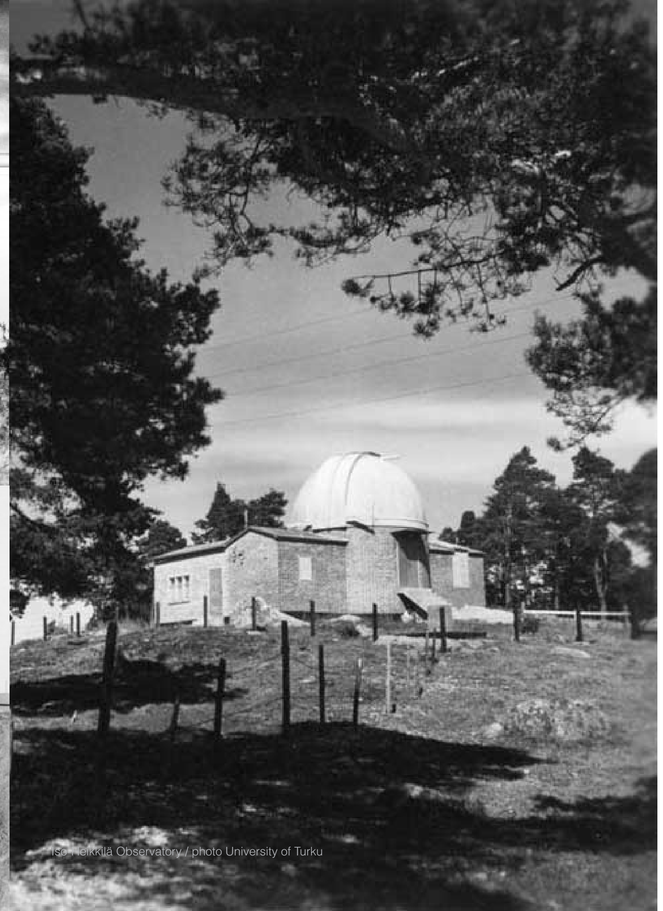
The site, marked here with a continuing line, is situated in the north west of central Turku, between the neighbourhoods of Iso-Heikkilä and Port Arthur, in an area that mainly consist of small industries and storage buildings. Bordering the area to the west is the residential areas of Iso-Heikkilä and Paterinhaka, where both tall apartment buildings and single family houses can be found. The street tukholmankatu acts as a boundary toward the south while the railway borders the area on the north side.

The Linnakaupunki area, marked here with the dashed white line, combines several different neighbourhoods and enviroments into the same general zoning plan (Linnakaupungin osayleiskaava). In the future, the area will be developed into a neighbourhood with residential buildings, office spaces and services. With the exception of a few culturally valuable buildings, most of the current small industry and storage structures will be demolished.[1]

[1]Linnakaupunki OYK

Patterinhaka 1955 / photo Aamuset

Kanslerintien kasarmi / photo [illegible]



Iso-Heikkilä Observatory / photo University of Turku

2.2 | A brief history of the surroundings

The historial and cultural values of Linnakaupunki have been thoroughly examined while making the new general zoning plan of the area, and this is only a brief summary for the purposes of this project.

The oldest building in the area is the barracks on Kanslerintie, built by and for Russian soldiers at some time around the first World War. The original building has been renovated and expanded on multiple occasions. It is protected by an sr-3 classification.

Some of the land in Iso-Heikkilä was owned by the University of Turku, and the universitys botanical garden was located here between 1924 and 1956. The only remaining structure that reminds the neighbourhood of its academic past is the observatory, built in 1936. The observatory has been given an sr-3 rating.

One of the most distinctive areas around the site that will not be demolished in the near future is the wooden one family house neihgbourhood along Maaherrankatu, Jäärämaankatu and Latokartanonkatu. Most of the buildings date back to the 1930's and 40's and are protected buildings marked as class sr-4; significant buildings in the cityscape.

The apartment buildings in Patterinhaka, that are often called "the first suburb in Turku", were constructed between 1954 and 1957, and are marked as sr-3-protected buildings. They were amongst the first Arava-projects.

The development of the area was continued in the beginning of the 60's in north Iso-Heikkilä, with a dozen new seven-story apartment buildings. These are currently also protected with a sr-2 classification.

It was also during the 1960's that the industrial zone started to form between Tukholmankatu, Vaasantie and Iso-Heikkiläntie. Of these buildings though, only a couple are marked as protected, none of which are close to the site of Linnakaupunki school.[1]

[1]Linnakaupunki OYK

Vision for Linnakaupunki
Cederqvist & Jäntti Arkkitehdit Oy

2.3 | Current planning situation

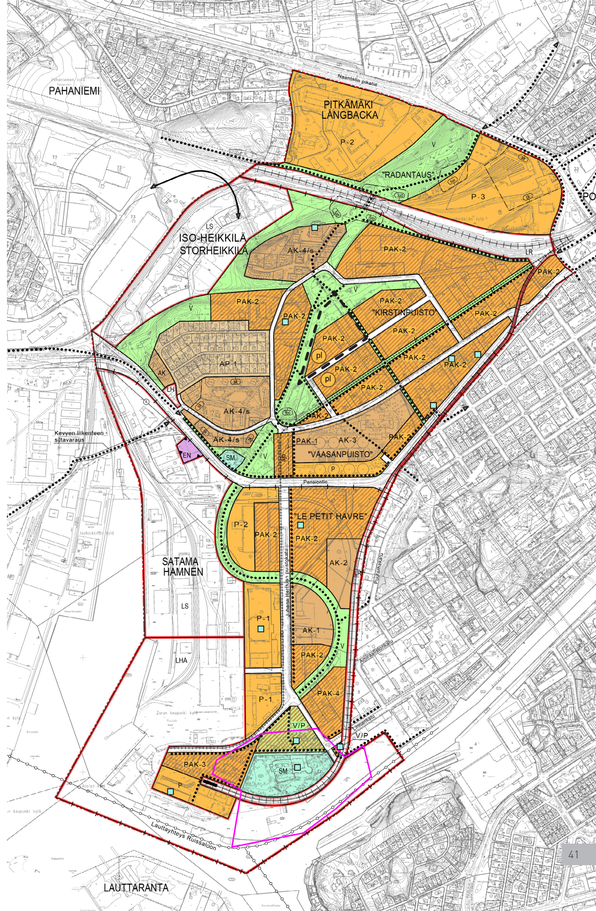
The general plan for Linnakaupunki was prepared between 2007 and 2011, and was officially accepted in 2012. The objectives of the plan are to develop and unite the area that is currently not being used to its' full potential, utilise its geographical position close to the city centre and the harbour, in the middle of several important thoroughfares. The general plan aims to establish a lot of new housing, offices and services for the inhabitants. In numbers, the plan creates a possibility for 20 000-25 000 new inhabitants and 20 000 - 27 000 new workplaces. The year of implementation is set as 2030.[1]

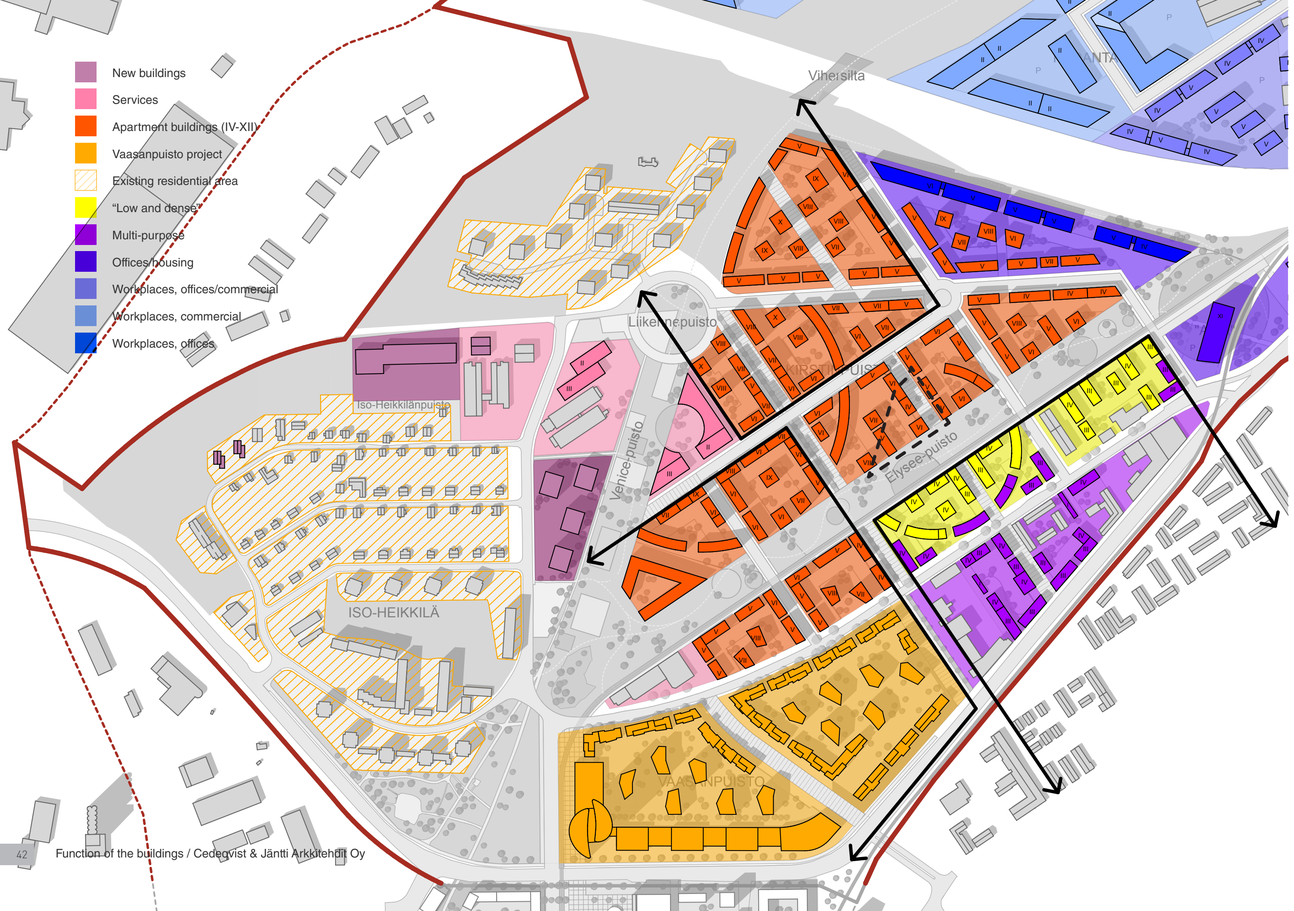
After the acceptance of the general plan, work continues by developing new detail plans for the area. Some detail plans (Kanslerintie, Herttuankulma) are already finished while others (Vaasanpuisto, Kirstinpuisto) are in preparatory phases. No new detail plan has yet been initiated when it comes to the planned site of the school, but the area will probably be handled once the detail plans currently in progress have been finished.[2]

As part of the preparatory work for the general plan, architects Cederqvist & Jäntti designed a "Vision for Linnakaupunki" to illustrate the future of the area. The material presented on the next pages is a part of that project, which I have chosen to utilise as a point of reference when planning the school.

[1]Linnakaupunki OYK

[2]Turun kaupungin ajatasa-asemakaava





Traffic arrangements around the site
Cederqvist & Jäntti Arkkitehdit Oy

- Main thoroughfare
- Street
- Living street
- Pedestrians and cyclists
- Tram
- Tram stop
- Train

Parks and green spaces around the site
Cederqvist & Jäntti Arkkitehdit Oy

- Parks
- Greenspace
- Green connection

2.4 | The immediate site

The site designated for the school is presently partly on a park-like lot, partly covered by some of these industrial buildings. Vaasantie, which borders the site to the west, will be turned into a park according to future plans, and the two other sides of the lot will be bordered by residential areas.

The topography of the site is relatively flat, rising slightly towards the north. The incline is so small that it will not affect the planning significantly, but it should be considered when planning the drainage of rain water.

Concerning daylight circumstances, the most significant factor will be the future buildings on the east and south sides of the site. Because of the wide park axis to the west of the site, sunlight from this direction is practically guaranteed.

Access to the site by car will in the future be from the street planned to the south of the site (see traffic arrangements on previous page), which is also generally the main access direction if you arrive by public transport (bus or tram). By foot or by bike, the access to the site will probably be mainly from the park axis to the west of the site ("Venice park"), or from the bicycle path that runs along the east border of the site.

Although the site is situated in a reasonably urban area, the views from the site are quite open and green (pictures on the left). After the area has been developed as planned, the views to the north and south will remain the same, while the view to the east ans south will be partially obstructed by the new buildings.

View from Akselintie toward the site

2.5 | Conclusions of the analysis

The future vision for the area of Linnakaupunki is urban and quite dense, with both housing, offices and commercial areas. The envisioned cityscape should be considered when designing the school building to fit both the immediate environment and the area in general.

As the site is situated quite close to the city centre and easily accessible by public transport, bicycle or even by foot, these means of transport should be considered in the planning of the building and the layout of the site. From this standpoint, as well as the aspect of sustainability, car access and parking spaces are, while necessary, not paramount.

The position of the site next to a large park axis is a major asset and should be utilised as much as possible, for example by connecting the schoolyard to the park. This positioning also gives the borders of the site very different characteristics, as some are distincly urban and some connected to the calm green park area. This should also be considered in the architecture of the school building.

3 | PLANNING PROCESS

3.1 | Creating the room programme

3.2 | Concept testing & evaluation

3.3 | Choosing the concept to develop

3.1 | Creating the room programme

The room programme was born as a result of a combination of factors. Firstly, and most importantly, the input of the city of Turku, that suggested using the room programme from Syvälahti school as a starting point, focusing on multipurpose community spaces. The second idea, also from the city of Turku, was to create a school that could be expanded in stages, growing as the neighbourhood of Linnakaupunki grew. This meant that the room programme had to be divided into three phases. As each home unit can accomodate around 110 pupils, the first phase has spaces for 330 students, the second and third phase for 220 pupils each, resulting in a school for around 770 children. The Linnakaupunki school will be an elementary school, for children aged 7-15.

Studying other room programmes for schools that were of similar size, the programme for the architecture competition of Jätkäsaari school stood out to me, although this programme didn't have any sports facilities.

In the end, the room programme for Linnakaupunki school is a compromise of the programmes of Syvälahti and Jätkäsaari schools, combined with the recommendations of the RT file standards.

The room programme | Phase I

01 | Main hall and lobby area

Cafeteria / Festivity hall	300 m²
Stage	65 m²
Stage storage & backstage area	32 m²
Cloakroom	43 m²
Restrooms	32 m²
Cleaning storage	5 m²
Food distribution & tray return	100 m²
Kitchen	88 m²
Dishwashing	30 m²
Cold room	10 m²
Storage	16 m²
Staff break room	16 m²
Staff changing room	6 m²
Staff restroom	2 m²
Staff shower	2 m²
Total	747 m²

02 | Administration and teachers' spaces

Janitor	10 m²
IT-supervisor	10 m²
Administraition office	140 m²
Archive	10 m²
Meeting spaces	34 m²
Cleaning storage	5 m²
Health care space	46 m²
Staff cafeteria	87 m²
Staff cloakroom and lockers	118 m²
Staff showers	7 m²
Staff restrooms	8 m²
Total	475 m²

03 | Sports facilities

Gymnasium		715 m²
Storage space	55 m²	
Changing rooms		40 m²
Showers		20 m²
Restrooms		20 m²
Instructors' changing room		19 m²
Accessible restroom		6 m²
Total		875 m²

04 | Home unit spaces (units A-C)

General teaching spaces	808 m²
Cloakroom and lockers	60 m²
Restrooms	60 m²
Materials, printing	60 m²
Cleaning closets	17 m²
Total	1005 m²

05 | Other teaching spaces

Science teaching spaces	215 m²
Laboratories	130 m²
Storage	23 m²
Art & crafts workshop	274 m²
Storage spaces	40 m²
Wood- and metalwork	395 m²
Storage spaces	16 m²
Music	178 m²
Music storage space	30 m²
Cooking/home economics	212 m²
Storage	14 m²
Total	1527 m²

06 | Maintenance, storage, cleaning and HVAC

Outdoor equipment storage	40 m²
Property maintenance	20 m²
Main cleaning storage	20 m²
Groundskeeping storage	10 m²
Waste disposal	30 m²
HVAC space	200 m²
Total	320 m²
Total programme area: (Phase I)	4949 m²

Phase II

07 | Library and youth spaces

Service desk, loans and returns	21 m²
Exhibition	65 m²
Cloakroom	14 m²
Restrooms (+ accessible)	16 m²
Event space	44 m²
Childrens area	50 m²
Youth area	52 m²
Adults' area	50 m²
Magazines	40 m²
Storage	7 m²
Youth center	124 m²
Equipment and game storage	8 m²
Total	441 m²

08 | Home unit spaces (units D-E)

General teaching spaces	577 m²
Cloakroom and lockers	136 m²
Restrooms	36 m²
Materials, printing	60 m²
Cleaning closets	10 m²
Total	819 m²

09 | HVAC

Hvac space	75 m²
Total programme area: (Phase II)	1335 m²

Phase II

10 | Child health centre

Reception and waiting room area	122 m²
Restrooms (incl. accessible)	15 m²
Appointment rooms x 4	72 m²
Nurses' office	22 m²
Examination room	35 m²
Psychologist x 2	15 m²
Break room	26 m²
Staff dressing room	23 m²
Equipment storage	15 m²
Equipment cleaning	7 m²
Total	352 m²

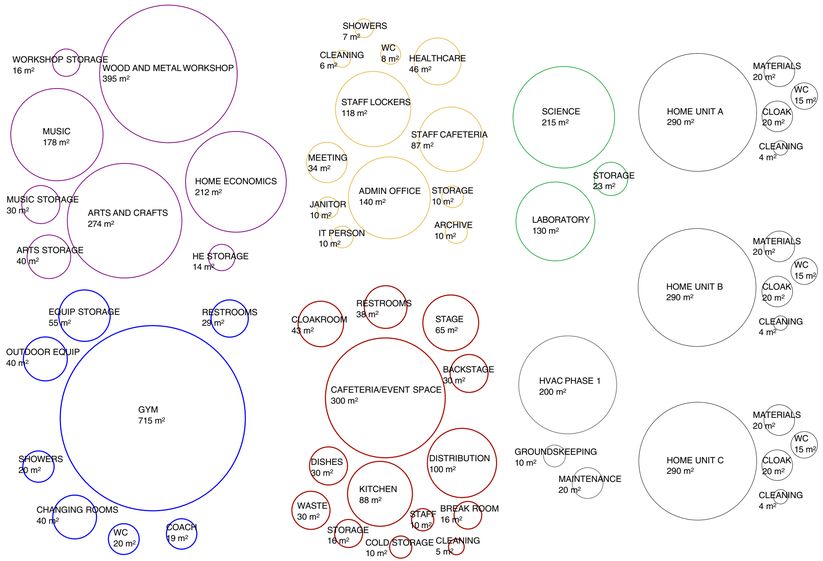
11 | Home unit spaces (units F-G)

General teaching spaces	532 m²
Cloakroom and lockers	68 m²
Restrooms	40 m²
Materials, printing	42 m²
Cleaning closets	10 m²
Total	692 m²

12 | HVAC

Hvac space	63 m²
Total programme area: (Phase III)	1107 m²

The room programme visualised



3.2 | Concept testing and evaluation

In order to be able to evaluate the concepts objectively, it was useful to formulate a set of criteria to measure the qualities, positive and negative, of each option. The concept that most successfully encompassed the following criterie would be further developed into the actual proposal for the Linnakaupunki school.

The criteria were:

Flexibility of teaching spaces - how well can the spaces accomodate different types of work: group/individual, silent/loud, lecturing/studying, large/small space and so on?

Growing potential - how well can the building expand and adapt as the population of Linnakaupunki grows?

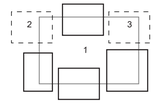
Relation to surroundings - how well does the character of the building fit the environment? Height, mass etc.

Efficacy - is the building efficient, i.e. what is the room programme to actual surface area ratio?

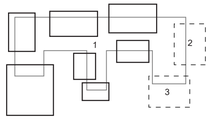
Orientation - is the layout of the building easy to comprehend and navigate, also for children?

In addition to the above criteria, the architecture of the building should also be inspiring and have a certain insightful quality. This can be achieved in a multitude of different ways, obviously for example by the choice of materials, textures, colours and so on, but also through visible bearing structures, hierarchy of spaces, relation to nature etc. Ideally, the architecture would inspire the students both scientifically and artistically.

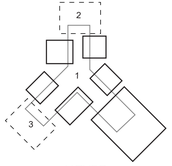
Studying expansion possibilities of the different school building types



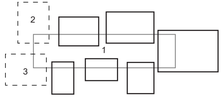
O-TYPE



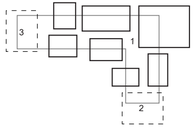
E-TYPE



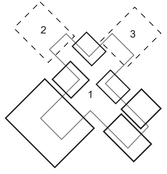
Y-TYPE



I-TYPE

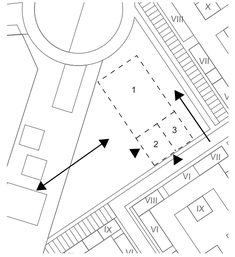


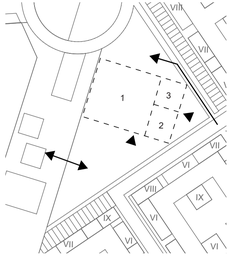
L-TYPE

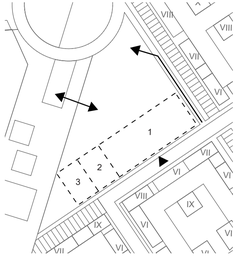


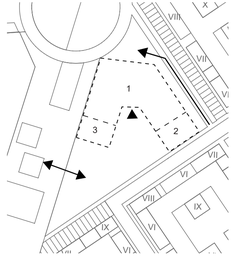
X-TYPE

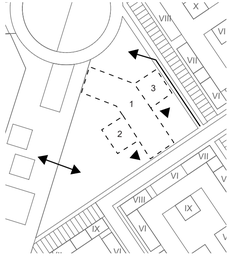
Studying different building mass concepts on the site

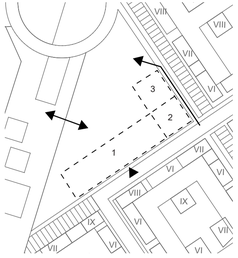


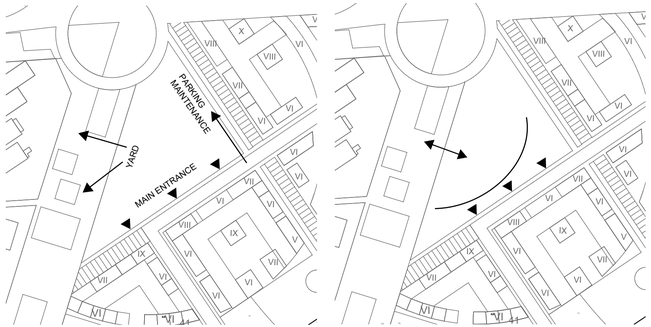












3.3 I Choosing the concept to develop

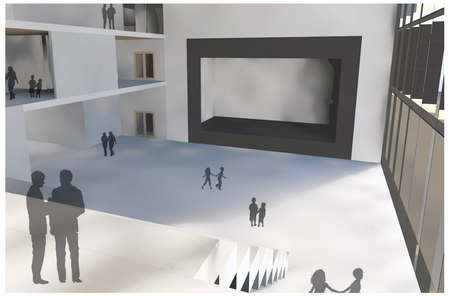
The choice of concept was not an easy one, as all the options seemed to have both potential and problems. The O-type concept was considered for a long time, but discarded because of its' less effective window wall area to floor area ratio. Different kinds of X- or Y-type concept were also thoroughly researched, but difficult to fit into the triangular site. In addition, I wasn't satisfied that these typologies would fit into the gridlike cityscape of Linnakaupunki.

After carefully weighing the different concept options against each other, I chose to develop the I/L-type concept further. The assets of this concept were that the building mass fit into the grid system and thus was firmly anchored to the street space and to the neighbourhood in general. This positioning of the mass also encourages multi-purpose and evening use, as it opens up the facade and activities inside the school for the public, making it a relevant community space. The I/L-concept sits naturally on the site, and the location of the main entrance, the schoolyard and the parking lot and maintenance seem to fall into place in a way that works.

The building mass also acts as a protective divider between open, public street space and the more private, luscious schoolyard. This has benefits both spatially, as the pupils have their own space that is "hidden" from the public, and practically, as it decreases the risk of children running close to a trafficked street.

The issues with the concept were how to handle the different phases so that the library and the health center would be easily accessible from the street. This in addition to all the other street level spaces that would be used in the evening. Another challenge was solving the access to maintenance and parking spaces. In spite of the issues, this would be the concept to develop into the proposal.

Studying exterior and interior views of the selected concept



4 | PROPOSAL - COMPLETING THE PROJECT

BUILT ENVIRONMENT 1:5000

4.1 | Built environment and site plan

As seen on the overview of the built environment, the building forms a considerable mass, larger than average in the neighbourhood, but due to its shape it fits into the gridlike cityscape of the envisioned Linnakaupunki. The school is brought right up to the street, like most of the buildings in the area, forming a unified network of streetscapes.

The mass of Phase I is extended, first along the street by Phase II, then along the bicycle path with Phase III. Like this, the building retains its main character while the phases II and III are still easily accessible.

The schools main entrance is situated toward the street, as are most of the minor entrances. It is marked by a two story entrance niche, making orientation easier for visitors. The sports facilities, music spaces and two-story workshop spaces have their own smaller entrance, also from the street, to serve both school pupils, evening and weekend users. The entrance to the library and health center are both clearly visible from the street.

Protected from the street by the building mass, the schoolyard forms its own greenspace together with Venice park, a major park in the neighbourhood. The south west corner of the site, also connected to the park, forms a separate activity yard, to be used as a space for physical education, both by pupils and outside users. Neither of the yards are connected to the street, which improves their safety.

Access to the parking area and the maintenance enctrance is arranged from the street, along the bicycle path to the north of the building mass. All home units are also directly accessible from the street via diverse staircases.

The main schoolyard is equipped both for learning and playing and everything in between. Mostly retaining its natural park landscape, there are some paved areas for different game activities, climbing spaces as well as areas for outdoor teaching and schoolwork. A plant garden, maintained by the pupils themselves, is also a practical way to mix learning and playing.

SITE PLAN 1:1000

4.2 | Floor plans

The main entrance opens up directly toward the cafeteria/ main hall, and as such also toward the schoolyard. Closely connected to the hall are the food distribution lines, the kitchen and the home economics spaces. The home economics spaces can be divided by a partition wall, depending on the size of the classes. It also makes it possible to have two evening cooking classes at the same time. Because of the direct contact with the distribution lines, the home economics class can easily serve their cooking creations to the rest of the pupils.

The scene and music spaces are located to the left of the main entrance, with the secene opening up toward the cafeteria hall. The main staircase acts as added audience seating during big events. The closeness of the music spaces makes it easy to transport instruments and other performance equipment onto the stage. The music spaces can also act as a larger backstage if needed.

Opposite of the music spaces, the two story workshop is divided into wood- and metalwork and heavy machinery on the ground floor, and art and handicraft spaces on the second floor. The heavy machinery space is separated because of both noise and safety factors, so the workshop can be used separately for tasks that do not require as much supervision.

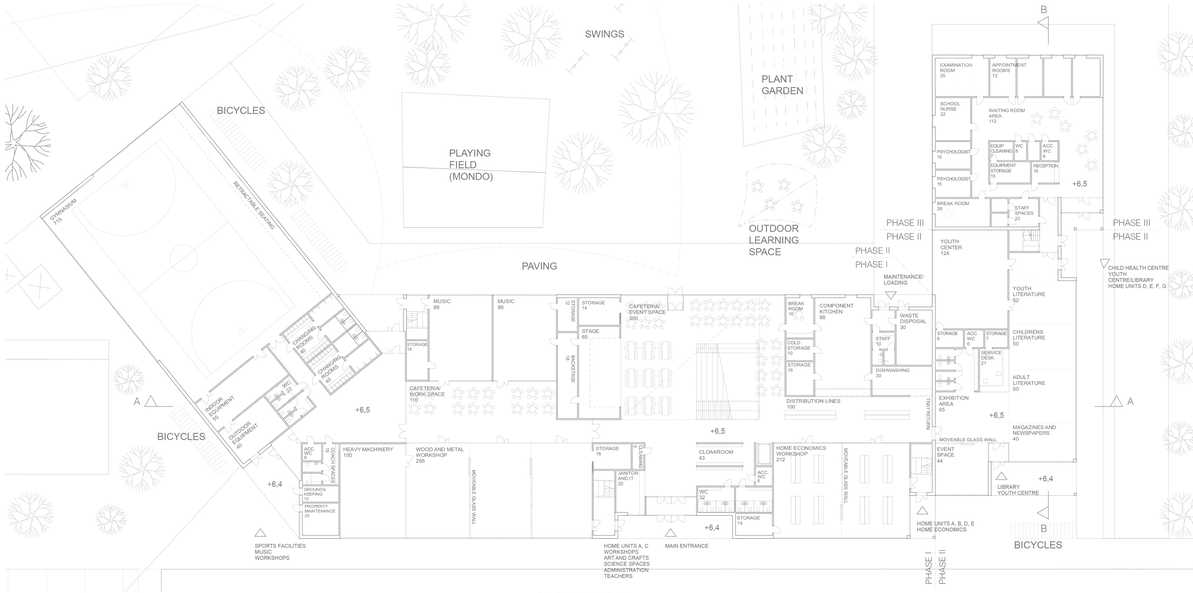
The sports facilities are situated in their own part of the building, connected to the workshop and music spaces (the “loud corner). The facilities are intended for heavy evening and weekend use, with retractable audience seating for weekend games. The storage spaces also connect directly to the activity yard, making it easier to use.

On the second floor we find the art and handicraft spaces, connected to the ground floor workshop via a staircase. These spaces are also divisible to accomodate classes with different sizes or purposes. This space is also direclty accessible from the street, facilitating evening and weekend use.

The teaching and administrative staff spaces are situated at the back of the second floor, prioritising accessibility to students spaces. The main workstations are in an open plan office divided by a glass partition wall. This makes the staff spaces more flexible to changes, as they are not arranged in a rigid one person per room pattern. For staff that have one to one appointments with pupils, there are separate private counseling rooms to be used for this purpose. For teachers or other staff that may not have their own desk, there is an open work space to use freely when needed. The large sized cafeteria is also intended to be used as a “coffice”. The health care space can be converted into more staff spaces when the health center is constructed (Phase III).

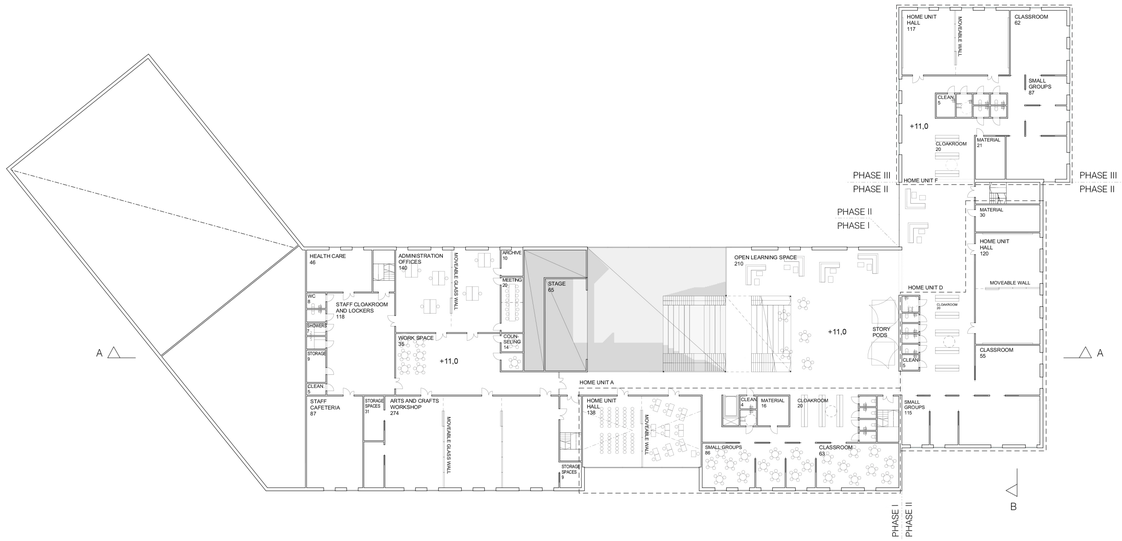
Home units A, D and F are situated around the main staircase and open learning spaces, making them easily accessible and connected by view to the main hall. The home unit layout follows the same pattern on the third floor.

The open learning space on the second and third floor is intended to be used as an extention of the home unit, offering relaxed, homelike spaces for group work, individual work or just hanging around during the recess. It works as a sort of main square for the building, as you have large views of what is happening in the school while also being a meeting place where people cross paths.



GROUND FLOOR 1:400

View from the street towards the main entrance

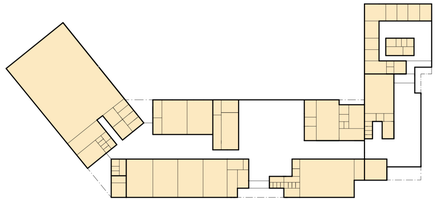


SECOND FLOOR 1:400

View from the main hall

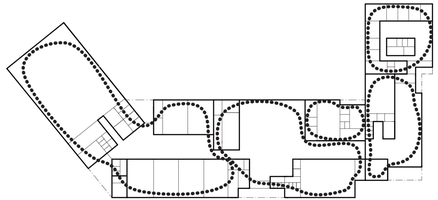
THIRD FLOOR 1:400

4.3 | Diagrams



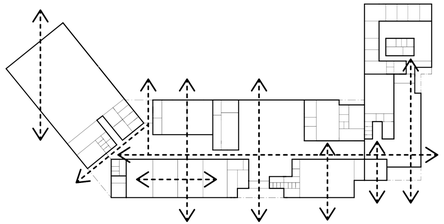
Streets and squares

Orientation in the building is easy because of the "main street" running through the whole school, creating long lines of view. The street never seems corridor-like because of the many squares that are created when the street widens.



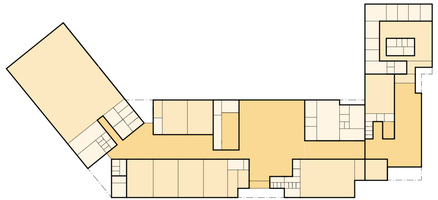
Evening and weekend use

The groud floor spaces are divided into several clusters that can be used independently, meaning that they have their own entrances and restrooms. Movements in the building can also easily be restricted and supervised because of the doors between each cluster.



Views and supervision

Throughout the building there are long lines of view, facilitating both orientation and supervision. Views through the whole building bring the green yard to the street and the passers-by.



Public and private space

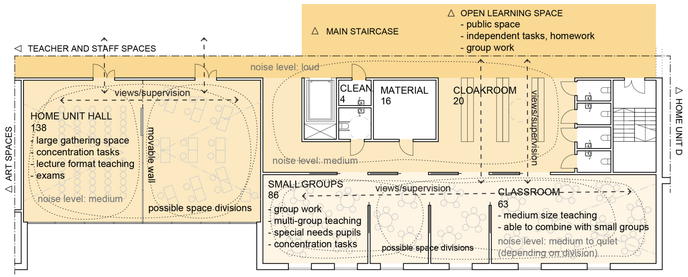
The character of the spaces range from public (main hall) to private (home unit group spaces). An important aspect in creating flexible learning spaces is to provide enough variation to suit different types of learners.

4.4 | Home unit concept

The spaces of the home unit strive to be as flexible as possible, providing spaces of different sizes, from public to more private spaces, from noisy to quiet. The use of the spaces is also made more flexible through partition walls and wide sliding doors.

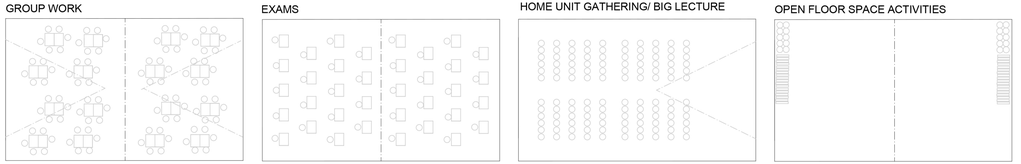
The home unit hall is the heart of the unit, providing a gathering space for all pupils in one unit (up to 120) during information assemblys etc.

The classroom is a medium sized learning space, providing a classic setting for hands on teaching and group work for about 45 pupils. Connected to the classroom are the small group teaching spaces, ranging from 10 to 30 pupil rooms. These are especially adapted to close supervision work and special needs pupils. The wide sliding doors can either be closed, providing very private and quiet learning spaces, or open, connecting the group rooms to each other, making it easier for one teacher to supervise several spaces at once.



HOME UNIT A 1:200

Home unit hall layout options



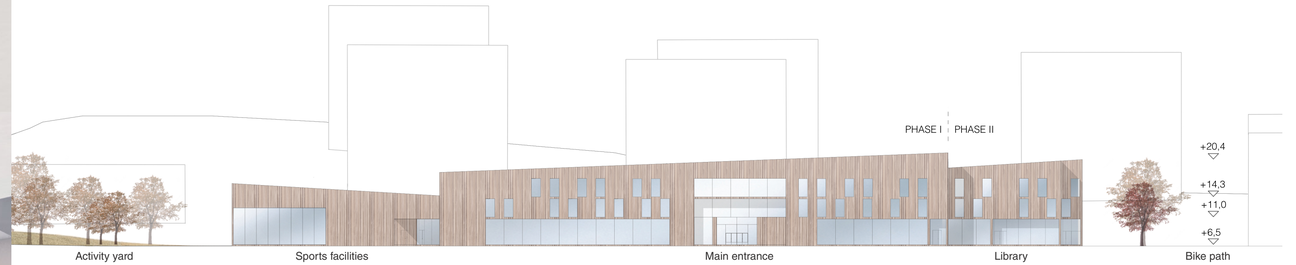
4.5 | Elevations and sections

The main objectives for the elevations are to facilitate orientation and to open up the activities in the school to the public. The large glass walls on the ground floor expose the activities and liven up the street while the second and third floor windows create a more intimate and calm space.

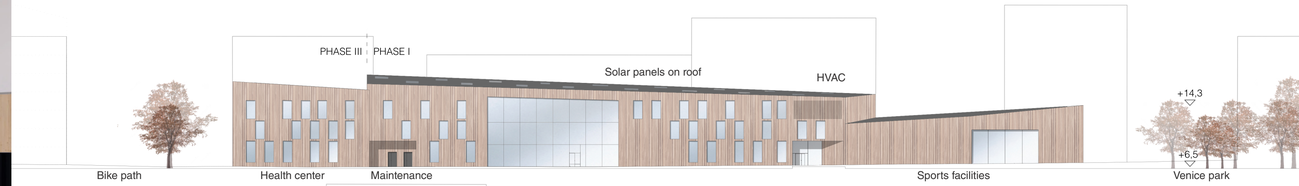
The entrances are clearly marked as niches in the main building mass, extending either one or two floors (main entrance).

Wood is used as the main material of construction as it is a renewable resource. The bearing structure is mostly CLT-elements, with a larch wood external cladding.

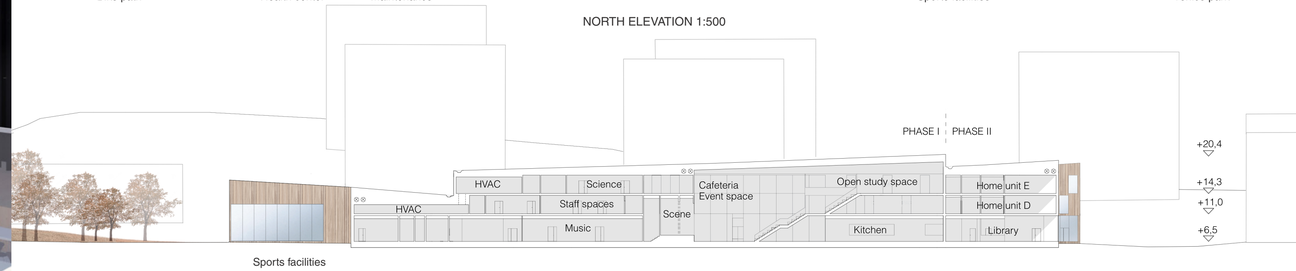
View from the second floor towards the stage



SOUTH ELEVATION 1:500

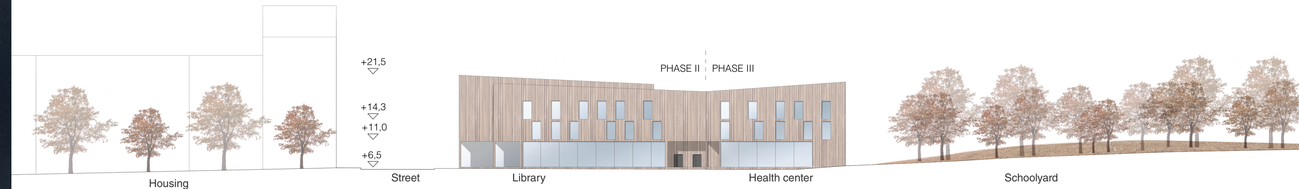


NORTH ELEVATION 1:500

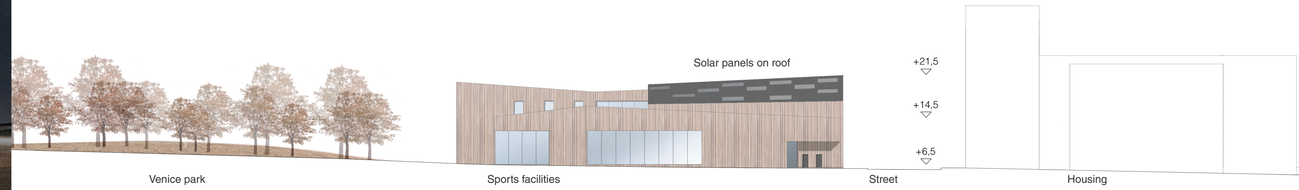


SECTION A-A 1:500

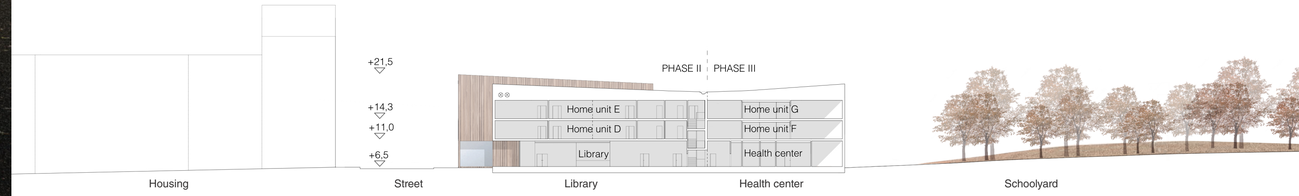
Night view from the street towards the main entrance



EAST ELEVATION 1:500



WEST ELEVATION 1:500



SECTION B-B 1:500

4.6 | Conclusions

Working with school architecture as a thesis subject has been both challenging and rewarding. It is a significant responsibility to plan the architecture of the spaces where younger generations will not only learn but spend a large part of their childhood. They are spaces where kids will experience both success and failure, make friends and possibly enemies, and create memories for life.

Defining the line between pedagogics and architecture is also a hard, and perhaps futile task. How much can the architecture of a school influence the teaching, and how much do the teaching methods and practices of the time control the use of the spaces? Collaboration is key here, as in many other types of projects. Having said that, too many different opinions and views can blur and complicate the objective, as I noticed during this project.

As for the final proposal presented in this thesis, I am partly satisfied and partly conflicted. In a project of this size, the objectives can be too numerous and diverse, which highlights the importance of prioritising. Towards the end, I found that certain ideas had to be set aside in order to produce a result, even objectives that I had previously thought important.

All in all, the project has been more of a learning experience than a clear journey towards a final result, and the proposal I present in this thesis leaves a lot to be defined and planned out in greater detail. But then again, that's the nature of architecture, there is always room for improvement.

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